

**REMARKS**

***Summary of the Office Action***

In the subject Office Action, Claims 1-13 are rejected under 35 U.S.C. §103(a) as being unpatentable over the art of record. Furthermore, Claims 14-20 have been allowed. Based on the following Remarks, Applicant submits that the rejections have been overcome and respectfully requests reconsideration of the outstanding Office Action.

***Acknowledgement of Allowable Subject Matter***

Applicant gratefully acknowledges the Examiner's indication that Claims 14-20 have been allowed. In particular, the Examiner states that Claims 14-20 are considered allowable since the prior art made of record does not teach or suggest the claimed limitations. The Examiner submits that prior art references GLENN, HUNG and NISHIKAWA, whether taken alone or in combination, fail to teach the claimed limitations of a semiconductor package comprising a die pad including a plurality of peripheral frame segments which each define opposed top and bottom surfaces and collectively define a central opening; and a plurality support feet attached to at least some of the frame segments of the die pad, wherein the support feet are disposed within the central opening and extend downwardly relative to the bottom surfaces of the frame segments, as is recited in independent Claim 14.

***Traversal of Rejection Under 35 U.S.C. §103(a)***

**Over GLENN in View of HUNG**

Applicant respectfully traverses the rejection of Claims 1-9 and 11-13 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,281,568 to Glenn et al. [hereinafter "GLENN"] in view of U.S. Patent No. 6,476,469 to Hung et al. [hereinafter "HUNG"] and what the Examiner purports to be the Applicant's submitted prior art [hereinafter "ASPA"].

With regard to independent Claims 1 and 9, the Examiner submits that GLENN teaches all the features recited in Claim 1, except that GLENN fails to teach a semiconductor package 50 which comprises a plurality of support feet attached to the peripheral edge of the

die pad and extending downwardly relative to the bottom surface thereof. The Examiner then submits that HUNG teaches in Figures 2 and 3D (column 3, line 51 through column 4, line 59) a package that comprises a plurality of support feet/supporters 220 attached to the peripheral edge of the die pad 204 and extending downwardly relative to the bottom surface thereof. The Examiner then contends that it would have been obvious to one of ordinary skill in the art at the time the invention was made to form a package comprising of a plurality of support feet/supporters 220 attached to the peripheral edge of the die pad 204 and extending downwardly relative to the bottom surface, as taught by HUNG to arrive to the claimed limitations in order to increase the overall contact area between the die pad and the plastic material so that the die pad is less prone to dislocation from the plastic encapsulation material (column 4, lines 33-35, line 42-44).

#### *A Review of GLENN*

Figure 2 of GLENN is a plan view of a leadframe used for making a semiconductor package. The leadframe 20 includes a peripheral rectangular tie bar 21 and a central rectangular dambar 29. A die pad 22 having a rectangular perimeter is connected to leadframe 21. Die pad 22 is positioned inside dambar 29. Two connectors 28 connect die pad 22 to dambar 29 and tie bar 21 of leadframe 20. Eighteen leads 30 are connected to and extend laterally from tie bar 21 through dambar 29 toward a side of die pad 22 without contacting die pad 22.

Figure 5 of GLENN is a cross-sectional side view of a completed package 50. The package 50 is made from leadframe 20. Die pad 22 of package 50 includes a planar or substantial planar upper first surface 23. Opposite the first surface 23 of die pad 22 is a planar or substantially planar second surface 24 and a planar or substantially planar peripheral third surface 25. *The third surface 25 surrounds the second surface 22 and is vertically recessed a distance H1 from second surface 22. The third surface 25 is vertically between first surface 23 and second surface 24 and is covered with the encapsulant material that forms the package body 51. The encapsulant material beneath the third surface 23 prevents die pad 22 from being pulled vertically from the package.* The second surface 22 is exposed at lower surface 56 of package 50, and accordingly forms part of lower second surface 56 of package 50.

*A Review of HUNG*

Figures 2 and 3C-D depict a semiconductor package leadframe 202, a die pad 204 and a plurality of leads 206. A plurality of supporters 220 are formed on the back surface 203 of the die pad 204. The supporters 220 are formed by half-etching or coining. The supporters 220, unlike a conventional package structure, do not have a step structure. Hence, moisture can only enter by way of the supporters 220 and the edges of the die pad 204. *As stated in column 4, lines 39-42, the supporters 220 are positioned farther away from the edges of die pad 204 because this makes the package 202 less sensitive to moisture level.* Furthermore, the specification states that the supporters 220 will allow the die pad 204 to be gripped more firmly by increasing the contact area between plastic material 214 and the die pad 204.

*In re Independent Claims 1 and 9*

Applicant's independent Claims 1 and 9 each recite, *inter alia*, . . . a plurality of support feet attached to the *peripheral edge* of the die pad . . .

With respect to the aforementioned rejection, the Examiner has not provided a prior art reference or references which teach or suggest *all* the claimed limitations of the pending claims. To establish a prima facie case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claimed limitations. *See Lidden Industrial Products, Inc. vs. Solid State Systems, Corp., 755 F. 2d 158, 164, 225 U.S.P.Q. 34, 38 (Fed. Cir. 1985)* ("The references fail not only to expressly disclose the claimed invention as a whole, but also to suggest to one of ordinary skill in the art the modifications needed to meet *all* of the claimed limitations").

Even assuming, *arguendo*, that the combination of GLENN and HUNG is proper (which Applicant disputes), Applicant respectfully submits that such combination still does not teach or suggest the present invention as recited in independent Claims 1 and 9. As stated above, it is noted that Applicant's independent Claims 1 and 9 each recite, *inter alia*, . . . a plurality of support feet attached to the *peripheral edge* of the die pad . . . HUNG does not teach or suggest the aforementioned features. From Figures 2 and 3A-D, it is apparent that HUNG clearly does not show, teach or suggest the HUNG supporters 220 being

attached to the peripheral edge of the HUNG die pad 204. Rather, the HUNG supporters 220 are positioned well within the perimeter of the HUNG die pad 204.

Because neither GLENN nor HUNG discloses or suggests, *inter alia*, . . . a plurality of support feet attached to the peripheral edge of the die pad . . . , no proper combination of these references can render unpatentable the combination of features recited in at least independent Claims 1 and 9.

Accordingly, Applicant requests that the Examiner reconsider and withdraw the rejection of independent Claims 1 and 9 under 35 U.S.C. § 103(a) and indicate that these claims are allowable.

**Furthermore, HUNG teaches away from the Examiner's proposed modification**

The Examiner submits that it would have been obvious to attach the HUNG supporters 220 to the peripheral edge of the HUNG die pad 204. However, HUNG *teaches away* from the concept of support feet being formed and positioned on the peripheral edge of the HUNG die pad 204.

Supporting Applicant's position is the statement in the HUNG specification which makes it clear that conventional step structure 116 (see prior art Figure 1; col. 2, lines 17-26) are deficient because cracks are easily formed in the encapsulant around the peripheral portion of the die pad 104 which allow moisture to easily penetrate the package. Thus, the HUNG teachings encourage removal of the step structure 116 and replace the same with the supporters 220. But, as is clearly stated in the HUNG disclosure (see column 4, lines 39-42) "*the supporters 220 are positioned farther away from the edges of die pad 204 because this makes the package 202 less sensitive to moisture level*". From this passage, it is evident that HUNG teaches away from providing any type of support feet attached to the peripheral edge of a die pad.

Therefore, because HUNG teaches away from the Examiner's proposed modification, the proposed modification is not proper GLENN may not be modified in the manner the Examiner suggests.

Accordingly, Applicant requests that the Examiner reconsider and withdraw the rejection of independent Claims 1 and 9 under 35 U.S.C. § 103(a) and indicate that these claims are allowable.

*Additionally, the Applicant's disclosure may not be used as a template for a rejection (i.e. the Examiner has used impermissible hindsight to find motivation)*

Applicant also notes that the Examiner has the initial duty of supplying the factual basis for the rejection and may not, because of doubt that the invention is patentable, resort to speculation, unfounded assumption or hindsight reconstruction to supply deficiencies in the factual basis. See *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 177 (CCPA 1967). As stated in *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1533, 220 USPQ 303, 312-313 (Fed. Cir. 1983), cert denied, 469 U.S. 851 (1984):

[t]o imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which the inventor taught is used against it teacher.

It appears that the modification of GLENN in view of HUNG as proposed by the Examiner has resulted from a review of Applicant's disclosure and the application of impermissible hindsight to find motivation.

In particular, Applicant submits that the Examiner has merely used the Applicant's disclosure as a template to find obvious the features of independent Claims 1 and 9 which recites, *inter alia*, . . . a plurality of support feet attached to the *peripheral edge* of the die pad . . .

Therefore, it is submitted that the Examiner has used impermissible hindsight to find motivation for the proposed modification, and thus the rejection of at least independent Claims 1 and 9 under 35 U.S.C. § 103(a) is improper and should be withdrawn for this additional reason.

*In re Dependent Claims 2-8 and 11-13*

Further, for the foregoing reasons, Applicant submits that dependent Claims 2-8 and 11-13 are allowable at least for the reason that these claims depend from allowable independent Claims 1 and 9 and because these claims recite additional features that further define the present invention.

Accordingly, Applicant requests that the Examiner reconsider and withdraw the rejection of dependent Claims 2-8 and 11-13 under 35 U.S.C. Section 103(a) and indicate that these claims are allowable.

GLENN in view of HUNG and further in view of ASPA and NISHIKAWA

Applicant's respectfully traverse the rejection of Claim 10 under 35 U.S.C. § 103(a) as being unpatentable over GLENN in view of HUNG in view of ASPA and further in view of U.S. Patent No. 5,654,585 to Nishikawa [hereinafter "NISHIKAWA"].

The Examiner submits that GLENN and HUNG disclose the claimed limitations except for the leadframe wherein each of the inner support bars includes a downset. The Examiner then submits that NISHIKAWA teaches in Figures 10 and 13A the leadframe comprising a die pad portion 11 supported by a plurality of suspension leads 12 including a downset. The Examiner contends that it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the leadframe which comprises a die pad portion supported by a plurality of suspension leads including a downset, as taught by NISHIKAWA to arrive to the claimed limitations in order to improve manufacturing yield (col. 7, lines 5-10).

*Dependent Claim 10*

As pointed out above, neither GLENN nor HUNG, when considered individually or in combination, teach or suggest, *inter alia*, . . . a plurality of support feet attached to the *peripheral edge* of the die pad . . . as is recited in Applicant's independent Claim 9. If anything, HUNG teaches away from providing support feet positioned about the peripheral edge of the HUNG die pad 204.

Therefore, Applicant submits that as neither GLENN nor HUNG discloses or suggests, *inter alia*, . . . a plurality of support feet attached to the peripheral edge of the die pad . . . , no proper combination of these references can render unpatentable the combination of features recited in at least independent Claim 9.

Further, for the foregoing reasons, Applicant submits that dependent Claim 10 is allowable at least for the reason that this claim depends from allowable independent Claim 9 and recites additional features that further define the present invention.

**Additionally, Applicant submits that there is no proper motivation to modify GLENN in view HUNG and further in view of at least NISHIKAWA**

As already stated, the Examiner contends that it would have been obvious to one of ordinary skill in the art at the time the invention was made to form a leadframe which comprises a die pad portion supported by a plurality of suspension leads including a downset, as taught by NISHIKAWA to arrive to the claimed limitations in order to improve manufacturing yield (col. 7, lines 5-10). **There is absolutely no need to downset the GLENN leads as argued by the Examiner.**

By referring to the passage in the specification which the Examiner relies upon for motivation (col. 7, lines 5-10), it is clear that the Examiner's motivation is taken from the wrong context. The passage states:

In the bent portions 5c, 5d, as shown in FIGS. 13B, and 13C, the width of the bended inside is made wider than that of the outside. By forming the suspension lead 12 in this manner, the suspension lead 12 can be stably formed based on a principle similar to the case of the above-mentioned embodiment, and *manufacturing yield can be improved*.

It appears that the aforementioned passage is only explaining why for the portion 5c of the suspension lead 11 which has a tapered cross-section, the top of the lead is thinner than that of the bottom of the lead (and vice versa for portion 5d). The aforementioned passage does not provide any reasons for why one would be motivated to modify the GLENN leads to be downset. Rather, the Examiner's motivation is flawed because there truly is no reason to modify the GLENN leads to be downset. As seen in Figure 5, the inner distal ends of the leads 30 are intended to be even with the die pad 22 (see col. 9, lines 1-8) which states:

In FIG. 5, the portion of the first surface 31 of lead 30 that is internal to package body 51 is in the same horizontal plane as first surface 23 of die pad 22, and third surface 33 of lead 30 is in the same horizontal plane as third surface 25 of die pad 22. In an alternative embodiment (not shown), where die pad 22 is up set in the mold, the portion of first surface 31 of lead 30 that is inside package body 51 would be in a lower horizontal plane than first surface 23 of up set die pad 22.

Moreover, after reviewing the aforementioned passage, it appears that GLENN suggests that the alternative embodiment might include an upset die pad, which also then

necessarily suggests upset leads - not downset leads. Moreover, one of the primary reasons GLENN provides the third surface 33 feature on the leads 30 is so that the encapsulant 55 retains the severed leads 30 in the package 55. If the GLENN leads 30 were downset, such modification would destroy the function the GLENN lead design.

Therefore, it is submitted that the Examiner has failed to provide sufficient motivation for the proposed modification, and thus, the rejection of dependent Claim 10 under 35 U.S.C. § 103(a) as being unpatentable is in error.

Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of dependent Claim 10 under 35 U.S.C. § 103(a) and indicate that this claim is allowable.

***Application is Allowable***

Applicant respectfully submits that each and every pending claim of the present invention meets the requirements for patentability and respectfully requests that the Examiner indicate the allowance of such claims.



**CONCLUSION**

In view of the foregoing, it is submitted that none of the references of record either taken alone or in combination thereof, anticipate or render obvious Applicant's invention as recited in Claims 1-13. The applied references of record have been discussed and distinguished, while significant claimed features of the present invention have been pointed out.

Accordingly, reconsideration of the outstanding Office Action and allowance of the present application and all the claims therein are respectfully requested and now believed to be appropriate.

If any additional fee is required, please charge Deposit Account Number 19-4330.

Respectfully submitted,

Date: 11/19/04

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